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REMARKS

Claims 1-5 and 8 were pending in this application. Claims 1 and 3-5 have been amended. Claims 2 and 8 have been canceled. Accordingly, claims 1 and 3-5 are currently being examined.

The Office Action from page 4, paragraph 2 to page 5, paragraph 3 rejected claims 5 and 8 under 35 U.S.C. §112, second paragraph, as being indefinite. More specifically, according to the Office Action, in claim 5, the phrase "the deposited pure metal or alloy layer" lacks an antecedent basis. Also, the Office Action states that claim 8 contains several phrases which are unclear, indefinite or lack an antecedent basis.

Applicants hereinabove have amended claim 5 to more clearly recite "the deposited metal layer", which has an antecedent basis in amended claim 1. Further, applicants have cancelled claim 8. Accordingly, applicants respectfully submit that amended claim 5 is not indefinite and that the rejection of claim 8 is now moot.

In view of the amendments to claim 5, the cancellation of claim 8, and the remarks above, applicants respectfully submit the rejections of claims 5 and 8 as being indefinite have been overcome. Accordingly, applicants respectfully request that the rejection of claims 5 and 8 as being indefinite be reconsidered and withdrawn.

The Office Action from page 5, paragraph 4 to page 6, last paragraph, provisionally rejected claims 1-5 and 8 on the grounds of non-statutory obviousness-type double patenting over U.S. Application No. 11/074,568 to Yoo et al. ("Yoo application").

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According to the Office Action, the present application has independent claims which are not patentably distinct from claims 5-9 of the Yoo application at least in reciting a depositing step and a peeling step, and thus, claims 1-5 and 8 would be obvious variants of the claims of the Yoo application.

Applicants hereinabove have amended independent claim 1 to include the specific plating solution recited in canceled claim 2, including particular ranges for the components of the plating solution and for the temperature range. In addition, claim 1 has been further amended to recite a particular pH range of 2-4. Also, applicants have amended claims 3, 4 and 5 to recite "a direct current", "a pulse current", and "a periodic reverse current" plating process, respectively, to correct for the loss of the antecedent bases for these phrases in amended claim 1. Support for these amendments can be found, inter alia, on page 7 in lines 10-19 and on page 12 in line 12-16 of the present specification. Also, applicants hereinabove have cancelled claim 8.

Applicants respectfully submit that independent claim 1, as amended, alone or in combination with the pending dependent claims, does not encompass claims 5-9 of the Yoo application at least because: (1) the ranges for the pH and certain elements of the plating solution of amended claim 1 do not encompass the ranges recited in the Yoo application, compare, for example, the pH range ("2-4") and the nickel sulfate range ("100-400 g/l") of amended claim 1 with the respective ranges ("1.5 to 6") and ("0-600 g/l") recited in claim 9 of the Yoo application; and (2) the claims of the Yoo application do not limit the temperature

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range. Since, as discussed more fully below, the particular ranges recited are crucial to the making of a biaxially textured metal layer, applicants respectfully submit that amended claim 1 is patentably distinct from claims 5-9 of the Yoo application.

Since a claim which depends on another claim is subject to all the limitations of that other claim, applicants respectfully submit that amended claims 3-5 are patentably distinct over claims 5-9 of the Yoo application for at least the same reasons discussed above with respect to amended claim 1. In addition, since claim 8 has been cancelled, this rejection of claim 8 is now moot.

Nevertheless, to advance prosecution of this application, applicants attach, as Exhibit A, a Terminal Disclaimer To Obviate A Provisional Double Patenting Rejection Over A Pending Reference Application under 37 C.F.R. §1.321(c). The Yoo application is commonly owned with this application by the Korea Institute of Machinery and Materials as shown on the records of the U.S. Patent and Trademark Office.

In view of the amendments to claim 1, the attached Terminal Disclaimer, and the remarks above, applicants respectfully request that the provisional rejection of claims 1-5 and 8 on the grounds of non-statutory obviousness-type double patenting over the Yoo application be reconsidered and withdrawn.

The Office Action from page 7, paragraph 1 to page 11, first paragraph, in section I, rejected claim 1, 3 and 8 as being unpatentable under 35 U.S.C. §103(a) over German Patent Publication No. DE 101 36 890 to Vogelaere et al., the English-language equivalent of this German Patent Publication, that is,

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U.S. Patent Application Publication No. 2004/0206630 to Kruger et al. (collectively, "Kruger publications"), International Publication No. WO 01/83855 to Moore et al. ("Moore publication"), and U.S. Patent No. 6,361,673 to Ameen et al. ("Ameen patent").

According to the Office Action, the Kruger publications show each element recited in claims 1, 3, and 8 except for: (a) the single-crystalline or a quasi-single-crystalline orientation, (b) the recited current densities and texture fractions of claim 3; and (c) winding the layer on a take-up reel as recited in claim 8. However, the Office Action also states that it would have been obvious for one of skill in the art to: (a) modify the orientation of the metal substrate of the Kruger publications because single-crystalline orientation can support high currents as shown by the Moore publication; (b) employ the recited current densities because the Moore publication shows such densities and, further, the texture fraction is inherent; and (3) wind the layer on a take-up roll as recited in claim 8 because the Ameen patent shows such winding.

As discussed above, applicants hereinabove have cancelled claim 8 and amended independent claim 1 to include the specific plating solution recited in canceled claim 2, including particular ranges for the components of the plating solution and for the temperature range. In addition, claim 1 has been further amended to recite a particular pH range of 2-4.

Applicants respectfully submit that the Kruger publications, the Moore publication, and the Ameen patent, taken

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alone or in combination, fail to teach or suggest the specific plating solution, pH range and temperature range ("plating conditions") as recited in amended claim 1. Indeed, of these cited references only the Moore publication relates to particular plating conditions and these plating conditions are significantly different from the plating conditions recited in amended claim 1. For example, as taught by the present invention, the "highest (100) orientation is obtained" when the plating solution has a pH of 2-4, see page 12 at lines 12-14 of the present specification. The importance of this pH range, which is recited in amended claim 1, is not taught or suggested by the Moore publication.

One reason for this difference in plating conditions is that the primary purpose of the Moore publication is to form biaxially textured metal layers as thin coatings on the surface of a metal article ("substrate"). These metal layers in the Moore publication typically act as "oxygen barrier" layers and are chosen from rhodium, osmium, etcetera, see from page 4, line 30 to page 5, line 16 of the Moore publication. The purpose of the "oxygen barrier" is to protect the metal article from oxygen and thus have a typical thickness of 10 μm or less.

In contrast, the purpose of the present invention is to produce "biaxially textured metal material" itself, not a thin layer for coating purposes. To produce such a material requires a complex electroplating process under the severe limited plating conditions as recited in amended claim 1. Thus, for at least this reason the Moore publication, taken alone or in combination with the Kruger publications and/or the Ameen

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patent, fails to teach or suggest at least the plating conditions recited in amended claim 1.

Also, while the Moore publication states that a single-crystal orientation can support the high currents required by many applications of superconductors, see page 1 at lines 4-13 of the Moore publication, this statement means that an epitaxial film having single-crystalline or a quasi-single-crystalline orientation with few types of grain boundary between crystals is advantageous for supporting high currents for such applications. However, this statement of the Moore publication does not mean that a metal substrate having a single-crystalline or a quasi-single-crystalline orientation is required to manufacture a biaxially textured metal material, as taught by the present invention and as recited in amended claim 1. Accordingly, applicants respectfully submit that amended claim 1 is not unpatentable over the Kruger publications, the Moore publication or the Ameen patent, taken alone or in combination, for at least these reasons.

The Office Action, from page 11, paragraph 2 to page 12, paragraph 2, in section II, also rejected claim 2 as being unpatentable under 35 U.S.C. §103(a) over the Kruger publications and the Moore publication as applied to claim 1, 3 and 8, and also further in view of Lowenheim, "Electroplating", (1978), pages 212-213 ("Lowenheim reference").

According to the Office Action, the Kruger publications show each element recited in claim 2, except for the particular plating solution, but that the such a plating solution would have been familiar to those with knowledge of electrodeposition

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as shown in the Lowenheim reference, and that because the Moore publication shows that electrodeposition can be used to form a textured metal surface, it would have been obvious for one of skill in the art to modify the nickel or nickel alloy of the Kruger publications for electrodeposition with the plating solution of the Lowenheim reference.

Applicants respectfully submit that the Lowenheim reference relates to compositions of 'general' plating solutions, so called Watts baths. In contrast, the present invention teaches and recites in amended claim 1, the necessary conditions of electroplating that are crucial and specific for making "a biaxially textured metal layer" on the surface of a metal substrate so that the metal layer has "a single-crystalline or a quasi-single-crystalline orientation". Even more particularly, the specific plating conditions taught by the present invention as recited in amended claim 1 are directed to deliver a particular biaxial texture property orientation from the metal substrate (cathode) to the plated layer. Such plating conditions are not obvious to one having ordinary skill in the art. Indeed, the inventors discovered the plating conditions recited in amended claim 1 only through much trial and error. Thus, applicants respectfully submit that one of ordinary skill in the art would not have been led to combine the Kruger publications, with: (a) the Moore publication which only relates to thin coatings to protect metal substrates and not to the manufacture of biaxially textured metal material itself; (b) the Lowenheim reference which only relates to 'general' plating solutions; and/or (c) the Ameen patent which only relates to coating metal

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foil, to achieve the present invention which teaches manufacturing of biaxially textured metal material on the surface of a metal substrate having single-crystalline or a quasi-single crystalline orientation, as recited in amended claim 1. Accordingly, applicants respectfully submit that amended claim 1 is not taught or suggested by the Kruger publications, the Moore publication, the Ameen patent, and/or the Lowenheim reference, taken alone or in combination.

Because a claim which depends on another claim is subject to all the limitations of that other claim, applicants respectfully submit that claim 3 is not taught or suggested by the Kruger publications, the Moore publication, the Ameen patent, and/or the Lowenheim reference for at least the reasons discussed above with respect to amended independent claim 1.

In view of the amendment to claim 1 and the cancellation of claim 8, and the remarks above, applicants respectfully request that: (a) the rejection of claims 1, 3 and 8 as being unpatentable over the Kruger publications, the Moore publication, and the Ameen patent; and (b) the rejection of claim 2 as being unpatentable over the Kruger publications, and the Moore publication further in view of the Lowenheim reference be reconsidered and withdrawn.

The Office Action, from page 12, paragraph 3 to page 14, last paragraph, rejected claims 4 and 5 under 35 U.S.C. 103(a) over the Kruger publications and the Moore publication and further in view of Van Horn, "Pulse Plating", Dynatronix (August 5, 1999), pages 11-13 ("Van Horn reference").

According to the Office Action, the Kruger publications and

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the Moore application teach each element of claims 4 and 5 except for the pulse current and reverse current plating processes with the particular current and down times recited in claims 4 and 5, respectively, but that the Van Horn reference teaches same. Also, the Office Action stated that the recited texture fraction would be inherent in the deposited metal layer.

Applicants respectfully submit that, as discussed above with respect the Kruger publications, the Moore Publication, the Ameen patent, and the Lowenheim reference, the Van Horn reference fails to teach or suggest the particular plating conditions required to manufacture a biaxially textured metal material on the surface of a metal substrate having single-crystalline or a quasi-single crystalline orientation as taught by the subject invention and as recited in amended claim 1.

Since claims 4 and 5 depend from amended independent claim 1, and since a claim which depends on another claim is subject to all the limitations of that other claim, applicants respectfully submit that claims 4 and 5 are not taught or suggested by the Kruger publications and the Moore publication further in view of the Van Horn reference for at least the same reasons discussed above with respect to amended independent claim 1.

In view of the amendments to claim 1 and the remarks above, applicants respectfully request that the rejections of claims 4 and 5 as being unpatentable over the Kruger publications and the Moore publication further in view of the Van Horn reference be reconsidered and withdrawn.

In view of the amendments to claims 1 and 3-5, the

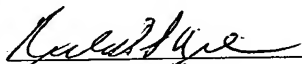
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cancellation of claim 8 and the remarks above, applicants respectfully request that the rejections raised in the Office Action be reconsidered and withdrawn, and respectfully submit that the application is now allowable and earnestly solicit a Notice of Allowance.

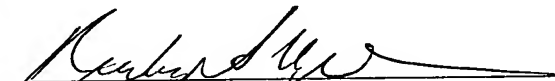
If a telephone conference would be of assistance in advancing prosecution of the subject application, applicants' undersigned attorney invites the Examiner to telephone him at the number provided.

No fees, other than the fee for the three-month extension of time and the fee for the Terminal Disclaimer, are deemed necessary in connection with the filing of this Amendment. However, if any additional fees are required, authorization is hereby given to charge the amount of any such fees to Deposit Account No. 03-3125.

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 28 February 2007
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